

PLUMBING I

COURSE DESCRIPTION

Plumbing I is a course that will introduce students to basic skills and knowledge related to residential and commercial plumbing. Topics covered include water distribution processes, installation of hot and cold water systems, and an introduction to drain, waste, vent systems in residential and commercial structures, cutting and fitting pipe, making joints, securing pipe, and roughing in. This course gives students an introduction to the skill and knowledge base typically required for apprentice plumbers.

Prerequisite(s):

Construction Core

Algebra I or Math for Technology II (may be concurrent)

Recommended Credits:

2

Recommended Grade Level(s):

11th

PLUMBING I STANDARDS

- 1.0 Students will demonstrate leadership, citizenship, and teamwork skills required for success in the school, community, and workplace.
- 2.0 Students will assume responsibility for the safety of themselves, their coworkers, and bystanders.
- 3.0 Students will interpret, layout, and fabricate in conformance to construction drawings and written specifications.
- 4.0 Students will comprehend the processes required to produce, treat, and distribute water.
- 5.0 Students will size and install cold water systems in residential and commercial structures.
- 6.0 Students will install and explain the operation of hot water systems in residential and commercial structures.
- 7.0 Students will explain drain, waste, and vent (DWV) system components.
- 8.0 Students will cut and fit plastic, copper, cast iron, and carbon steel pipe as specified in construction drawings, standards, manufacturer's instructions, and code requirements.
- 9.0 Students will make joints and install fittings in plastic, copper, cast iron, and carbon steel pipe as specified in construction drawings, standards, manufacturer's instructions, and code requirements.
- 10.0 Students will install hangers and supports to plastic, copper, cast iron, and carbon steel pipe as specified in construction drawings, standards, manufacturer's instructions, and code requirements.
- 11.0 Students will plan and lay out the rough-in for commercial and residential plumbing systems.

PLUMBING I

STANDARD 1.0

Students will demonstrate leadership, citizenship, and teamwork skills required for success in the school, community, and workplace.

LEARNING EXPECTATIONS

The student will:

- 1.1 Cultivate leadership skills.
- 1.2 Participate in SkillsUSA-VICA as an integral part of instruction.
- 1.3 Assess situations within the school, community, and workplace and apply values to develop and select solutions.
- 1.4 Demonstrate the ability to work cooperatively with others.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:

- 1.1.A Takes initiative in meetings to actively influence the results of deliberations.
- 1.1.B Uses critical-thinking and consensus building skills in group deliberations.
- 1.2.A Applies high ethical standards to personal, community, and professional situations.
- 1.2.B Participates and conducts meetings according to accepted rules of parliamentary procedure.
- 1.3.A Analyzes simulated workplace situations and uses problem-solving and critical-thinking techniques to suggest solutions the problem.
- 1.3.B Analyzes socio-economic conflicts associated with the construction industry and applies values to evaluate possible ways to mitigate the conflicts.
- 1.4.A Participates in a committee.
- 1.4.B Contributes to a group project.

SAMPLE PERFORMANCE TASKS

- Create a leadership inventory and use it to conduct a personal assessment.
- Participate in various SkillsUSA-VICA or similar programs and/or competitive events.
- Evaluate a civic project within the school, community, and/or workplace and evaluate the expected long term effects of the project.
- Prepare a meeting agenda for a school or a community meeting.
- Attend the meeting of a professional organization.
- Participate in a design team to complete an assigned project.

INTEGRATION LINKAGES

SkillsUSA-VICA, *Professional Development Program*, SkillsUSA-VICA, Communication and Writing Skills, Teambuilding Skills, Research, Language Arts, Sociology, Psychology, Algebra, Geometry, Applied Communication, Social Studies, Problem Solving, Interpersonal Skills, Employability Skills, Critical-Thinking Skills, SCANS (Secretary's Commission on Achieving Necessary Skills), Chamber of Commerce, Colleges, Universities, Technology Centers, and Employment Agencies

PLUMBING I

STANDARD 2.0

Students will assume responsibility for the safety of themselves, their coworkers, and bystanders.

LEARNING EXPECTATIONS

The student will:

- 2.1 Demonstrate a positive attitude regarding safety practices and issues.
- 2.2 Use and inspect personal protective equipment.
- 2.3 Inspect, maintain, and employ safe operating procedures with tools and equipment, such as hand and power tools, ladders, scaffolding, and lifting equipment.
- 2.4 Demonstrate continuous awareness of potential hazards to self and others and respond appropriately.
- 2.5 Assume responsibilities under HazCom (Hazard Communication) regulations.
- 2.6 Adhere to responsibilities, regulations, and company policies to protect coworkers and bystanders from hazards.
- 2.7 Adhere to responsibilities, regulations, and company policies regarding reporting of accidents and observed hazards, and regarding emergency response procedures.
- 2.8 Demonstrate appropriate related safety procedures.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:

- 2.1.A Is attentive during safety discussions.
- 2.1.B Actively seeks information about safe procedures.
- 2.1.C Responds positively to instruction, advice, and correction regarding safety issues.
- 2.1.D Does not deliberately create or increase hazards, such as by horseplay, practical jokes, or creating distractions.
- 2.1.E Reports to school or work physically ready to perform to professional standards, such as rested, or not impaired by medications, drugs, alcohol, etc.
- 2.2.A Selects, inspects, and uses the correct personal protective equipment for the assigned task.
- 2.3.A Inspects power tools for intact guards, shields, insulation, and other protective devices.
- 2.3.B Inspects extension cords for the presence of a functional ground connection, prior to use.
- 2.3.C Operates and maintains tools in accordance with manufacturer's instructions and as required by regulation or company policy.
- 2.3.D Properly places and secures ladders and scaffolding prior to use.
- 2.4.A Is observant of personnel and activities in the vicinity of the work area.
- 2.4.B Warns nearby personnel, prior to starting potentially hazardous actions.
- 2.5.A When asked to use a new hazardous material, retrieves MSDSs (material safety data sheets), and identifies the health hazards associated with the new material.
- 2.5.B Reports hazards found on the job site to the supervisor.
- 2.6.A Erects shields, barriers, and signage to protect coworkers and bystanders prior to starting potentially hazardous tasks.
- 2.6.B Provides and activates adequate ventilation equipment as required by the task.
- 2.7.A Reports all injuries to self to the immediate supervisor.
- 2.7.B Reports observed unguarded hazards to their immediate supervisor.
- 2.7.C Complies with personal assignments regarding emergency assignments.

- 2.8.A Passes with 100 % accuracy a written examination relating to safety issues.
- 2.8.B Passes with 100% accuracy a performance examination relating to safety.
- 2.8.C Maintains a portfolio record of written safety examinations and equipment examinations for which the student has passed an operational checkout by the instructor.

SAMPLE PERFORMANCE TASKS

- Conduct a practice drill simulating a hazardous solvent spill in which an emergency action plan is to be implemented.
- Instruct a visitor to obviously approach the vicinity of a student conducting a hazardous activity and note the level of awareness demonstrated by the student.
- For a project requiring the use of ladders and/or scaffolding, note the proper placement and securing procedures followed by students.

INTEGRATION/LINKAGES

Science, Computer Skills, Research and Writing Skills, Language Arts, Algebra, Geometry Communication Skills, Leadership Skills, Teamwork Skills, Secretary's Commission on Achieving Necessary Skills (SCANS), Skills USA-VICA, Associated Builders and Contractors (ABC), Associated General Contractors (AGC), National Center for Construction Education and Research (NCCER), Occupational Safety and Health Administration (OSHA), Environmental Protection Agency, United States Department of Labor, Tennessee Department of Labor and Workforce Development

PLUMBING I

STANDARD 3.0

Students will interpret, lay out, and fabricate in conformance to construction drawings and written specifications.

LEARNING EXPECTATIONS

The student will:

- 3.1 Interpret dimensions and locations of components that are explicitly dimensioned in construction drawings and written specifications.
- 3.2 Interpret plan and elevation views shown in construction drawings.
- 3.3 Recognize and correctly interpret lines and symbols commonly used in construction drawings.
- 3.4 Make layouts of locations and elevations of structural elements and plumbing components.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:

- 3.1.A Makes a material take-off in conformance to construction drawings and specifications.
- 3.1.B Lays out components, structural and others, and their locations to dimensions and tolerances indicated on construction drawings and written specifications.
- 3.2.A Interprets three-dimensional features found in construction drawings.
- 3.3.A Distinguishes between object lines, dimension and extension lines, center lines, section lines, and other lines commonly found in construction drawings.
- 3.3.B Identifies symbols commonly used in construction drawings, including material, window and door, electrical, plumbing, HVAC, and plot plan and survey symbols.
- 3.3.C Correlates symbols in electrical schematic and ladder diagrams with physical electrical components and their interconnections.
- 3.4.A Lays out locations and elevations of hot and cold water rough-in, based on construction drawings.
- 3.4.B Lays out locations and elevations of plumbing fixtures, based on construction drawings.

SAMPLE PERFORMANCE TASKS

- Given a set of plans and specifications for a residential or commercial structure, make a complete material take-off for the plumbing components.
- Given a set of plans and specifications for a residential or commercial structure, determine the location of plumbing elements not explicitly dimensioned.
- Determine the detail of specified routing and structural supports for piping shown in construction drawings.
- Construct batter boards and lay out a foundation plan based on a construction drawing, including grade stakes, locations of concrete forms, and plumbing and electrical stub-ups, e.g., using stakes, hammers, steel tapes, and builder's levels.

INTEGRATION/LINKAGES

Science, Computer Skills, Research and Writing Skills, Language Arts, Algebra, Geometry, Communication Skills, Leadership Skills, Teamwork Skills, Applied Communication,

Secretary's Commission on Achieving Necessary Skills (SCANS), Skills USA-VICA, Associated Builders and Contractors (ABC), Associated General Contractors (AGC), National Center for Construction Education and Research (NCCER), Occupational Safety and Health Administration (OSHA), Environmental Protection Agency, United States Department of Labor, Tennessee Department of Labor and Workforce Development, Plumbing, Heating and Cooling Contractors (PHCC).

PLUMBING I

STANDARD 4.0

Students will comprehend the processes required to produce, treat, and distribute water.

LEARNING EXPECTATIONS

The student will:

- 4.1 Summarize the sources of water and limits on availability.
- 4.2 Describe various treatment processes for preparing potable water.
- 4.3 Discuss municipal water delivery systems.
- 4.4 Describe hot and cold water distribution in residential and commercial structures.
- 4.5 Choose locations for shutoff valves.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:

- 4.1.A Researches sources of water and the related social and economic ramifications.
- 4.1.B Writes a report contrasting advantages, limitations, and costs of water sources.
- 4.2.A Researches available treatment processes for private water systems.
- 4.2.B Researches available treatment processes for municipal water systems
- 4.2.C Writes a report contrasting cost and effectiveness of various water treatment processes.
- 4.3.A Describes methods of maintaining pressure and reserve capacity in water systems.
- 4.3.B Interprets municipal drawings depicting water distribution systems.
- 4.3.C Reads a municipal water meter.
- 4.4.A Chooses a location of residential or small commercial water heater, based on a floor plan, and defends the choice of location.
- 4.4.B Sketches routing for hot and cold water piping, given a floor plan and proposed fixture locations.
- 4.4.C Justifies and describes the implementation of recirculating hot water systems in commercial buildings.
- 4.5.A Chooses the locations of hot and cold water shutoff valves on construction drawings, as required by code or for convenience.

SAMPLE PERFORMANCE TASKS

- Given a blueprint of a subdivision's water distribution system, determine sizes of water mains, pumps, size and location of water tanks, and location of shutoff valves.
- Read and record daily water usage for several days from a residential or commercial water meter. Extrapolate average daily usage to estimate annual usage.
- Compare and contrast the efficiency and operating costs of tank-type water heaters versus in-line water heaters.
- Determine optimum routing and sizes for piping, given a residential floor plan that includes location of all fixtures.

INTEGRATION/LINKAGES

Science, Computer Skills, Research and Writing Skills, Language Arts, Algebra, Geometry, Communication Skills, Leadership Skills, Teamwork Skills, Applied Communication, Secretary's Commission on Achieving Necessary Skills (SCANS), Skills USA-VICA,

Associated Builders and Contractors (ABC), Associated General Contractors (AGC), National Center for Construction Education and Research (NCCER), Occupational Safety and Health Administration (OSHA), Environmental Protection Agency, United States Department of Labor, Tennessee Department of Labor and Workforce Development, Plumbing, Heating, and Cooling Contractors (PHCC)

PLUMBING I

STANDARD 5.0

Students will size and install cold water systems in residential and commercial structures.

LEARNING EXPECTATIONS

The student will:

- 5.1 Determine the size of feeder pipe based on allowable pressure drop, flow requirements, and friction loss.
- 5.2 Mitigate the effects of water hammer in commercial and residential water systems.
- 5.3 Verifies the pressure integrity of water systems.
- 5.4 Prepare water systems for initial use.
- 5.5 Diminish the possibility of backflow in commercial and residential water systems.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:

- 5.1.A Finds the total demand flow rate through a feed line.
- 5.1.B Determines the delivery pressure at each tap on the feed line.
- 5.1.C Verify that the delivery pressure at each tap meets the needs of the intended use.
- 5.2.A Sizes and installs commercially-made and site-built air chambers where needed.
- 5.3.A Uses compressed air to verify pressure integrity and locates leaks in water systems.
- 5.3.B Uses hydrostatic tests to verify pressure integrity and locates leaks in water systems.
- 5.4.A Demonstrates how to flush a new water system of visible contaminants.
- 5.4.B Demonstrates initial disinfection of a new water system.
- 5.5.A Selects and installs appropriate backflow preventers.
- 5.5.B Maintains and tests common backflow preventers.

SAMPLE PERFORMANCE TASKS

- Given construction drawings for a large residence, determine the size of a long feed line supplying the residence.
- Install pressure gages to observe water hammer resulting from closure of a fast operating valve. Add an air chamber to demonstrate reduction of water hammer.
- Given a student constructed water distribution system, perform air and/or hydrostatic tests to verify pressure integrity.
- Given a student constructed water distribution system, flush and disinfect the system.
- Install and test specified backflow preventer in real or mockup water systems.

INTEGRATION/LINKAGES

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PLUMBING I

STANDARD 6.0

Students will install and explain the operation of hot water systems in residential and commercial structures.

LEARNING EXPECTATIONS

The student will:

- 6.1 Install gas and electric water heaters in residential and commercial water systems.
- 6.2 Comprehend the operation of and equipment required for hot water recirculation systems.
- 6.3 Explain the types and applications for solar-heated water systems.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:

- 6.1.A Explains the basic operation of water heaters, including operation of thermostats and pressure relief valves, and vent and air supply to gas units.
- 6.1.B Installs and tests gas water heaters.
- 6.1.C Installs and tests electric water heaters.
- 6.2.A Distinguishes among various types of hot water recirculation systems.
- 6.2.B Identifies the location of and specifications for all components of a recirculation system, given construction drawings detailing the system.
- 6.3.A Describes the types of solar-heated water systems.
- 6.3.B Describes the applications of solar-heated water systems.
- 6.3.C Contrasts and compares the operation of open- and closed-loop solar-heated water systems.

SAMPLE PERFORMANCE TASKS

- Install and test an electric hot water heater in a real or mock-up water system.
- Research (e.g., on the Internet) available solar-heated water systems for residential applications.

INTEGRATION/LINKAGES

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PLUMBING I

STANDARD 7.0

Students will explain and install drain, waste, and vent (DWV) system components.

LEARNING EXPECTATIONS

The student will:

- 7.1 Explain the operation of a simple DWV system.
- 7.2 Comprehend the components of a DWV system and their functional relationships.
- 7.3 Install DWV piping to appropriate or specified grade.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:

- 7.1.A Explains the purpose of traps in DWV systems.
- 7.1.B Explains the necessity for vents in DWV systems.
- 7.1.C Describes how a trap can lose its seal.
- 7.2.A Completes a material take-off for a DWV system in a single-family residence, given construction drawings and specifications.
- 7.2.B Explains the functional relationship between traps and vents in a DWV system.
- 7.3.A Interprets grade specifications included in construction drawings.
- 7.3.B Determines appropriate grade for drain when grade is not specified.
- 7.3.C Measures grades using hand levels, builder's levels, and laser systems.
- 7.4.D Installs and secures DWV piping to specified grade,
- 7.4.E Relates grade and velocity for different sizes of DWV piping.

SAMPLE PERFORMANCE TASKS

- On an operable lavatory mock-up, demonstrate a DWV system malfunction by blocking the vent.
- Complete a material take-off for DWV system, given construction drawings and specifications for a residential structure.
- Install several rooms of DWV piping to specified grades, given construction drawings and specifications for a residential structure.
- Measure the grade of existing DWV piping in a commercial structure.

INTEGRATION/LINKAGES

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PLUMBING I

STANDARD 8.0

Students will cut, fit, and install plastic, copper, cast iron, and carbon steel pipe.

LEARNING EXPECTATIONS

The student will:

- 8.1 Identify specified pipe by material, schedule, and compatible fittings.
- 8.2 Measure and cut pipe with corrections for pipe makeup and fitting allowances.
- 8.3 Plan the order of assembly of pipes and fittings.
- 8.4 Complete installations of piping systems in accordance with construction drawings, industry standards, manufacturer's instructions, and code requirements.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:

- 8.1.A Discerns material, schedule, and size of plastic pipe samples.
- 8.1.B Discerns type, size, and approved use of copper pipe samples.
- 8.1.C Discerns type and size of cast iron pipe samples.
- 8.1.D Discerns galvanizing, schedule, weight, and outside diameter of carbon steel pipe samples.
- 8.1.E Identifies and selects fittings compatible with specified pipe and intended use.
- 8.2.A Cuts and fits rigid pipe, making corrections for bends, pipe makeup, and fitting allowances.
- 8.2.B Cuts and fits bendable or flexible pipe making corrections for bends and fitting allowances.
- 8.3.A Plans an executable order of assembly, including the use of unions where necessary, for a specified pipe run.
- 8.4.A Completes the assembly of hot and cold water piping according to construction drawings, industry standards, manufacturer's instructions, and code requirements.
- 8.4.B Completes the assembly of drain, waste, and vent (DWV) piping according to construction drawings, industry standards, manufacturer's instructions, and code requirements.
- 8.4.C Completes the assembly of fuel oil and gas piping according to construction drawings, industry standards, manufacturer's instructions, and code requirements.

SAMPLE PERFORMANCE TASKS

- Presented with a collection of about a dozen pipe samples, identify them, and give examples of appropriate use.
- Given a collection of various types and sizes fittings, match the fittings with compatible pipe samples from above.
- Given a real or mockup residential or commercial structure, "rough in" the piping to kitchen and bathroom to satisfy construction plans, industry standards, and code requirements.

INTEGRATION/LINKAGES

Science, Computer Skills, Research and Writing Skills, Language Arts, Algebra, Geometry, Communication Skills, Leadership Skills, Teamwork Skills, Applied Communication,

Secretary's Commission on Achieving Necessary Skills (SCANS), Skills USA-VICA, Associated Builders and Contractors (ABC), Associated General Contractors (AGC), National Center for Construction Education and Research (NCCER), Occupational Safety and Health Administration (OSHA), Environmental Protection Agency, United States Department of Labor, Tennessee Department of Labor and Workforce Development, Plumbing, Heating, and Cooling Contractors (PHCC)

PLUMBING I

STANDARD 9.0

Students will make joints and install fittings in plastic, copper, cast iron, and carbon steel pipe as specified in construction drawings, standards, manufacturer's instructions, and code requirements.

LEARNING EXPECTATIONS

The student will:

- 9.1 Clean and prepare pipe ends, fittings, and valves for joining.
- 9.2 Join pipe ends to fittings and valves.
- 9.3 Inspect completed joints.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:

- 9.1.A Deburs and cleans plastic pipe, fittings, and valves in preparation for solvent weld joints.
- 9.1.B Deburs and cleans copper pipe, fittings, and valves in preparation for solder joints.
- 9.1.C Clean, thread, and deburr carbon steel pipe.
- 9.1.D Deburs and cleans cast iron pipe and fittings for compression joints.
- 9.2.A Completes solvent weld and solder joints.
- 9.2.B Assembles threaded joints using pipe joint compound or Teflon tape.
- 9.2.C Assembles compression and flange joints.
- 9.2.D Completes hub-and-bell joints in cast iron pipe.
- 9.3.A Visually examines completed joints for integrity and appearance.

SAMPLE PERFORMANCE TASKS

- Build PVC furniture.
- Given a specified start, end, and route, assemble a rigid copper pipe run requiring multiple fittings.
- Given a specified start, end, and route, assemble a run using soft copper pipe requiring multiple bends.
- Given a specified start, end, and route, assemble a steel pipe run requiring at least four fittings.
- Complete a specified drain and vent assembly, using bell-and-hub cast iron pipe.
- Given a real or mockup residential or commercial structure, cut, fit, and install piping to kitchen and bathroom fixtures to satisfy construction plans, industry standards, and code requirements.

INTEGRATION/LINKAGES

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Tennessee Department of Labor and Workforce Development, Plumbing, Heating, and Cooling Contractors (PHCC)

PLUMBING I

STANDARD 10.0

Students will install hangers and supports to plastic, copper, cast iron, and carbon steel pipe as specified in construction drawings, standards, manufacturer's instructions, and code requirements.

LEARNING EXPECTATIONS

The student will:

- 10.1 Select hangers and supports compatible with the type of pipe, supporting structure, application, construction drawings, and code requirements.
- 10.2 Install hangers and supports onto various supporting structures of different materials.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:

- 10.1.A Properly selects appropriate hangers and clamps for plastic pipe.
- 10.1.B Properly selects appropriate hangers and clamps for copper pipe.
- 10.1.C Properly selects appropriate hangers and clamps for cast-iron pipe.
- 10.1.D Properly selects appropriate hangers and clamps for steel pipe.
- 10.2.A Properly installs appropriate hangers and clamps onto wood.
- 10.2.B Properly installs appropriate hangers and clamps onto masonry.
- 10.2.C Properly installs appropriate hangers and clamps onto concrete.
- 10.2.D Properly installs appropriate hangers and clamps onto steel.

SAMPLE PERFORMANCE TASKS

- Install and secure pipe runs in a wood studded wall.
- Install and secure pipe runs to a concrete or masonry wall.
- Install and secure pipe runs in a steel frame structure.

INTEGRATION/LINKAGES

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PLUMBING I

STANDARD 11.0

Students will plan and lay out the rough-in for commercial and residential plumbing systems.

LEARNING EXPECTATIONS

The student will:

- 11.1 Determine the location of all fixtures and components, given a set of construction drawings and specifications.
- 11.2 Complete a material take-off of fixtures, components, and pipe estimates, given a set of construction drawings and specifications.
- 11.3 Lay out the physical location of each fixture and pipe run on a real or mock-up structure, given a set of construction drawings and specifications.
- 11.4 Install fixture carriers on a real or mock-up structure.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:

- 11.1.A Identifies fixtures and components specified on construction drawings and specifications.
- 11.1.B Estimates the lengths for each type and size of pipe needed for rough-in.
- 11.2.A Creates a bill of material for each stage of rough-in, including quantities of each size pipe, fixture carriers, and other required materials.
- 11.3.A Determines and marks the location, elevation, and pipe-routing for plumbing rough-in in the slab during the process of laying out a residential slab and beam foundation.
- 11.3.B Determines and marks the location, elevation, and pipe-routing for plumbing rough-in in walls, floors, and ceilings after completion of structural framing.
- 11.4.A Installs fixture carriers, such as sink and lavatory, urinals, handicapped facilities, etc., and constructs the required additional supporting structures.

SAMPLE PERFORMANCE TASKS

- Make a material take-off for rough-in, given construction drawings and specifications for a residential or small commercial structure.
- Make a plan for each stage of rough-in, coordinating with other construction activities, such as concrete foundation work, framing, and interior finish.
- Complete plumbing rough-in, including piping and fixture carriers, given a real or mock-up structure.

INTEGRATION/LINKAGES

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Protection Agency, United States Department of Labor, Tennessee Department of Labor and
Workforce Development,
NCCER 02402

PLUMBING I

SAMPLING OF AVAILABLE RESOURCES

- National Center for Construction Education and Research (NCCER), *Core Curriculum*. Prentice Hall, Upper Saddle River, NJ; ©2000. Also known as the “Wheels of Learning” materials.
- National Center for Construction Education and Research (NCCER), *Plumbing Level One*. Prentice Hall, Upper Saddle River, NJ; ©2000. Also known as the “Wheels of Learning” materials.
- National Center for Construction Education and Research (NCCER), *Plumbing Level Two*. Prentice Hall, Upper Saddle River, NJ; ©2001. Also known as the “Wheels of Learning” materials.
- National Center for Construction Education and Research (NCCER), *Plumbing Level Three*. Prentice Hall, Upper Saddle River, NJ; ©1993. Also known as the “Wheels of Learning” materials.
- National Center for Construction Education and Research (NCCER), *Plumbing Level Four*. Prentice Hall, Upper Saddle River, NJ; ©1993. Also known as the “Wheels of Learning” materials.